

Application/Control Number: 09/888,482

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Clmpto 09/21/01

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1. A document reading apparatus comprising:  
a document table for supporting a single document;  
a document tray for receiving a stack of documents;  
a line sensor for reading an image from each of the documents in units of lines parallel to a main scanning direction;  
a sensor transporter for transporting the line sensor to scan the document on said document table from one reading surface edge in the sub-scanning direction during a first reading mode;  
a document feeder for feeding each document received in said document tray such that the document is scanned from another reading surface edge opposite to the one reading surface edge of the document on said document table in the sub-scanning direction during a second reading mode; and  
a processing section for processing a reading result of said line sensor as image data;  
wherein said processing section has a controller for controlling a read start timing to compensate for a read range which may positionally deviate with respect to an identical effective reading area of each document between the first and second reading modes.

2. A document reading apparatus according to claim 1, wherein:

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said document table is transparent;

said line sensor is disposed below said document table to face a document placed on said document table with a reading surface thereof faced down; and

said document feeder is configured to feed a document received in said document tray with a reading surface thereof faced up such that the reading surface faces to said line sensor.

3. A document reading apparatus according to claim 1, wherein said controller is configured such that the read start timing is set in the first reading mode at a timing that transportation of said line sensor is started from a reference reading position where a reading surface edge of the document faces said line sensor, and is set in the second reading mode at a timing that the effective reading area reaches said line sensor located at the reference reading position.

4. A document reading apparatus according to claim 3, wherein said controller is configured to confirm that the document is fed over said line sensor by an idle-feeding distance, to obtain the read start timing in the second reading mode.

5. A document reading apparatus according to claim 4, wherein said controller is configured to calculate said idle-feeding distance based on a sub-scanning directional dimension of the document, a sub-scanning directional dimension of an image to be

produced according to the image data, and sub-scanning directional magnification.

6. A document reading apparatus according to claim 5, wherein said controller includes a document size detector which detects the sub-scanning directional dimension of the document received in said document tray.

7. A document reading apparatus according to claim 6, wherein said controller further includes an operation panel which enters the sub-scanning directional dimension of an image to be produced according to the image data, and the sub-scanning directional magnification.

8. A document reading apparatus according to claim 5, wherein controller includes an operation panel which enters the sub-scanning directional dimension of the document received in said document tray.

9. A document reading apparatus according to claim 8, wherein said operation panel is configured to further enter the sub-scanning directional dimension of an image to be produced according to the image data, and the sub-scanning directional magnification.

10. A document reading apparatus according to claim 5, wherein the controller includes an operation panel which enters the idle-feeding distance.

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--11. (New) A document reading apparatus comprising:  
a document table which supports a single document;  
a document tray which receives a stack of documents;  
a line sensor which reads an image from each of the  
documents in units of lines parallel to a main scanning  
direction;

a sensor transporter which transports the line sensor to  
scan the document on said document table from one reading surface  
edge in the sub-scanning direction during a first reading mode;

a document feeder which feeds each document received in said  
document tray such that the document is scanned from another

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reading surface edge opposite to the one reading surface edge of the document on said document table in the sub-scanning direction during a second reading mode;

a processing section which processes a reading result of said line sensor as image data; and

a controller which controls a read start timing to compensate for a read range which may positionally deviate with respect to an identical effective reading area of each document between the first and second reading modes.

12. (New) A document reading apparatus according to claim 11, wherein:

said document table is transparent;

said line sensor is disposed below said document table to face a document placed on said document table with a reading surface thereof faced down; and

said document feeder is configured to feed a document received in said document tray with a reading surface thereof faced up such that the reading surface faces to said line sensor.

13. (New) A document reading apparatus according to claim 11, wherein said controller is configured such that the read start timing is set in the first reading mode at a timing that transportation of said line sensor is started from a reference reading position where a reading surface edge of the document faces said line sensor, and is set in the second reading

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mode at a timing that the effective reading area reaches said line sensor located at the reference reading position.

14. (New) A document reading apparatus according to claim 13, wherein said controller is configured to check that the document is fed over said line sensor by an idle feeding distance, to obtain the read start timing in the second reading mode.

15. (New) A document reading apparatus according to claim 14, wherein said controller is configured to calculate said idle-feeding distance based on a sub-scanning directional dimension of the document, a sub-scanning directional dimension of an image to be produced according to the image data, and sub-scanning directional magnification.

16. (New) A document reading apparatus according to claim 15, wherein said controller includes a document size detector which detects the sub-scanning directional dimension of the document received in said document tray.

17. (New) A document reading apparatus according to claim 16, wherein said controller further includes an operation panel which enters the sub-scanning directional dimension of an image to be produced according to the image data, and the sub-scanning directional magnification.

18. (New) A document reading apparatus according to claim 15, wherein said controller includes an operation panel which enters the sub-scanning directional dimension of the document received in said document tray.

19. (New) A document reading apparatus according to claim 18, wherein said operation panel is configured to further enter the sub-scanning directional dimension of an image to be produced according to the image data, and the sub-scanning directional magnification.

20. (New) A document reading apparatus according to claim 15, wherein said controller includes an operation panel which enters the idle feeding distance.

21. (New) A controlling method in a document reading apparatus comprising the steps of:

checking a presence of a document on a document table;

checking a presence of a document in a document tray;

reading an image from the document in units of lines parallel to a main scanning direction by a line sensor;

setting a first reading mode when the document is present on the document table and moving a sensor transporter which transports the line sensor to scan the document on said document



table from one reading surface edge in the sub-scanning direction during the first reading mode;

setting a second reading mode when the document is present in the document tray and feeding the document received in the document tray such that the document is scanned from another reading surface edge opposite to the one reading surface edge of the document on said document table in the sub-scanning direction during the second reading mode;

controlling a read start timing to compensate for a read range which may positionally deviate with respect to an identical effective reading area of each document between the first and second reading modes; and

processing a reading result of said line sensor as image data.

22. (New) A controlling method according to claim 21, wherein

setting the read start timing in the first reading mode at a timing that transportation of said line sensor is started from a reference reading position where a reading surface edge of the document faces said line sensor; and

setting the read start timing in the second reading mode at a timing that the effective reading area reaches said line sensor located at the reference reading position.

23. (New) A controlling method according to claim 22, wherein checking that the document is fed over said line sensor by an idle feeding distance is performed to obtain the read start timing in the second reading mode.

24. (New) A controlling method according to claim 23 further comprising the step of:

calculating said idle-feeding distance based on a sub-scanning directional dimension of the document, a sub-scanning directional dimension of an image to be produced according to the image data, and sub-scanning directional magnification.

25. (New) A controlling method according to claim 24 further comprising the step of:

detecting the sub-scanning directional dimension of the document received in said document tray by a document size detector.

26. (New) A controlling method according to claim 25 further comprising the step of:

entering the sub-scanning directional dimension of an image to be produced according to the image data, and the sub-scanning directional magnification from an operation panel.